National Wind Technology Center

Providing state-of-the-art, world-class test facilities for the domestic wind industry

The National Wind Technology Center (NWTC) is the U.S. Department of Energy's national center for wind turbine research and development. Located on 280 acres of land near Boulder, Colorado, the NWTC is home to an Industrial User Facility, a Hybrid-Power Test Bed, a Variable-Speed Test Bed, an advanced research turbine test bed, as well as instruments for measuring wind conditions, modern structural-testing facilities, and a variety of commercial wind turbines. The unique wind characteristics at the NWTC provide an ideal environment for testing wind turbines in power-producing modes as well as in extreme, high-wind conditions.

The Industrial User Facility is specifically designed to accommodate the needs of the U.S. wind industry, providing a large laboratory space where turbines can be disassembled, analyzed, modified, and reassembled as needed. A blade-testing bay allows researchers and industry partners to study the performance and durability of blades more than 30 meters long, using modal, vibration, static-strength, and fatigue tests, as well as a variety of nondestructive tests.

The NWTC is also helping the U.S. wind industry by offering certification testing of industry turbines, which includes tests of power and noise output.

The Office of Power Technologies is part of the Office of Energy Efficiency and Renewable Energy

Highlights

- *Assists the U.S. wind industry through certification testing and structural, vibration, and modal testing of turbines and components*
- *Enhances market acceptance of wind technology by providing detailed wind resource estimates*
- *Contributes to the competitiveness of the U.S. wind industry through airfoil, component, and simulation software development and evaluation*
- *Helps the wind industry to achieve its potential to supply 10,000 MW–30,000 MW in the United States by 2010.*

NREL/PIX #04364

Engineers at the National Wind Technology Center work with blade manufacturers to design tests that will enable the blades to meet international standards. The tests range from nondestructive studies such as acoustic emissions to static-strength tests to determine when a blade will break.

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The NWTC features a total of 14 turbine test pads for performance testing of commercial turbines with as much as 1-megawatt capacity.

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The National Wind Technology Center is located at the foot of the Rocky Mountains near Boulder, Colorado.

The NWTC offers research facilities to test real-world operation of the turbines, including the Variable-Speed Test Bed and the Hybrid-Power Test Bed. The latter simulates village power loads and can simulate various power inputs to evaluate the performance of hybrid systems. The NWTC features a total of 14 turbine test pads for performance testing of commercial turbines with as much as 1-megawatt capacity.

Research turbines are also available at the NWTC, giving researchers the ability to test various configurations of rotors and other equipment. This ability is essential for development and verification of computer codes, which are at the heart of new turbine development. Using codes that model wind behavior, its interaction with the turbine, and the turbine's mechanical performance, the NWTC is helping advance the science of wind turbine design to allow more efficient designs at lower costs.

Project Partners

U.S. Department of Energy

National Renewable Energy Laboratory

For More Information:

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U.S. Department of Energy Wind Energy Program: *http://www.eren.doe.gov/wind*

Renewable Resource Data Center:
http://rredc.nrel.gov

Publications:
The National Wind Technology Center.
http://www.nrel.gov/wind/windpower.html

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